National Aeronautics and Space Administration
Jet Propulsion Laboratory
California Institute of Technology

Office of Safety and Mission Success (OSMS)

Presentation

to the

2006 Compliance Verification Workshop Austin, Texas

Matt Landano

Helmut W. Partma

September 27, 2006

Contents

- Purpose
- Introduction
- JPL OSMS Overview
- SMA Requirements
- FY ’06 Accomplishments
- Looking Ahead

Purpose

- Provide an overview of the JPL Compliance Verification Approach and Process

.

Introduction

- JPL assesses compliance with Institutional and SMA processes and technical requirements.
- The Office of Safety and Mission Success (OSMS) is the JPL independent organization responsible for establishing, implementing, and monitoring SMA requirements and Flow Down to Projects/Contractors
- Compliance Verification is “built into” the way JPL does business

JPL OSMS Overview

OSMS

- Provides independent reporting to the JPL Director for programs/projects.
  - "Health" status/risk assessment and reporting throughout the lifecycle
  - Checks and balances (engaged, embedded)
  - 350 personnel with technical expertise

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Office of Safety and Mission Success

JET PROPULSION LABORATORY

Charles Elachi, Director
Gene L. Tattini, Deputy Director
Thomas R. Gavin, Associate Director, Flight Projects and Mission Success
Firouz M. Naderi, Associate Director Programs, Project Formulation & Strategy

500
OFFICE OF SAFETY AND MISSION SUCCESS
Matt Landano, Director

Chief Project Assurance Manager
Richard Brace

Office of Safety and Mission Success Operations
Dudley Killam, Manager

Staff Engineer and GPMC Process Owner
Helmut Partma

Office 501
Business Operations
Gary McCutcheon, Manager

Office 502
Assurance Technology Program
Chuck Barnes, Manager

Office 510
Mission Assurance
Tom Fraschetti, Manager
Valerie Thomas, Deputy Manager

Office 530
Environmental, Health and Safety Program
Frank Mortelliti, Manager

Office 512
Quality Assurance
Thuy Nguyen-Onstott, Manager
Steve Flanagan, Deputy Manager

Office 513
Reliability Engineering
George Greanias, Manager
Naomi Palmer, Deputy Manager

Office 531
Systems Safety Program
Jim Lumsden, Manager

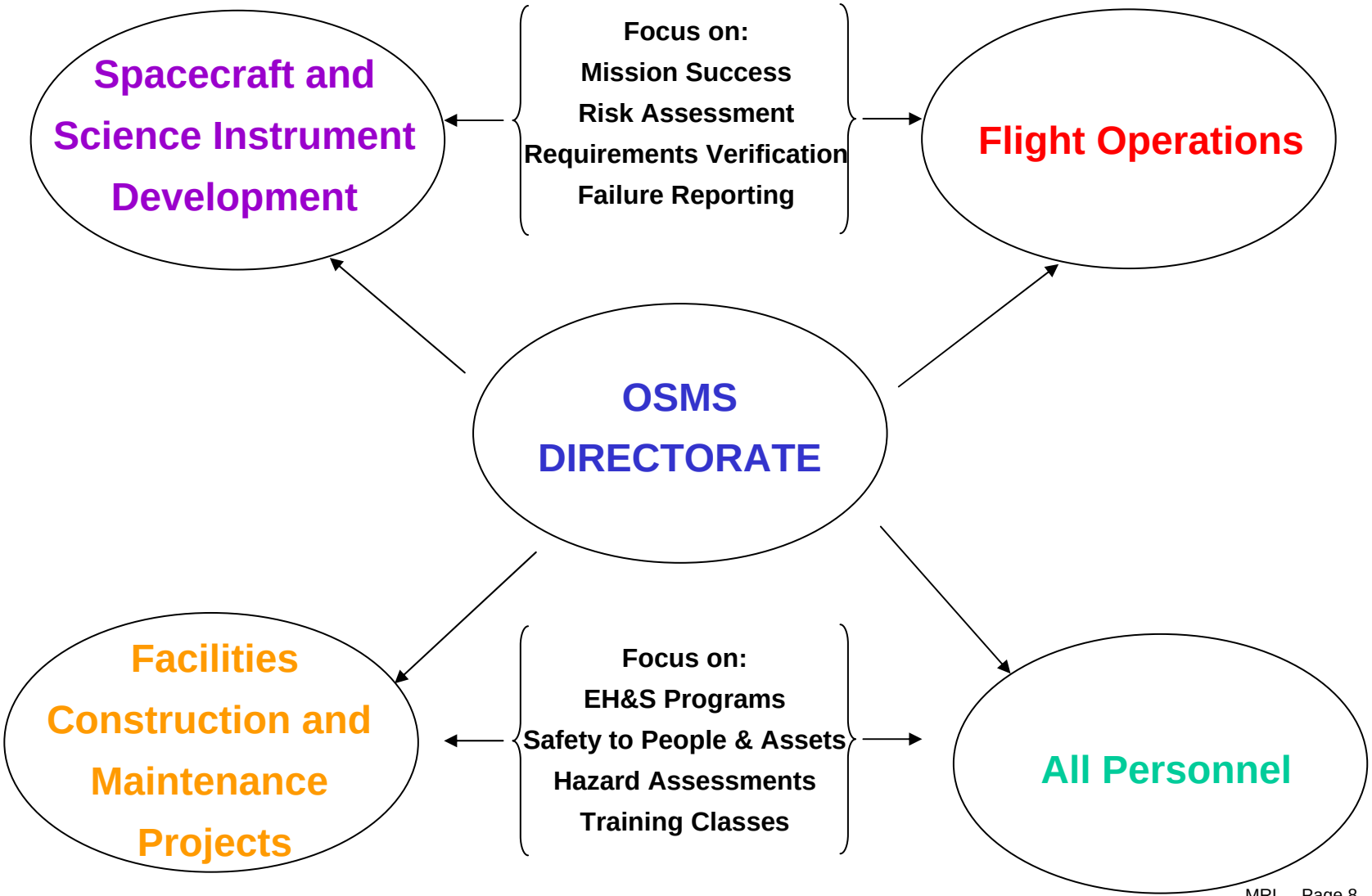
Office 532
Occupational Safety Program
Trish Smith-Araki, Manager

Office 514
Electronic Parts Engineering
Kristan Evans, Manager
Harald Schone, Deputy Manager

Office 515
Mission Assurance Management
Tom Fraschetti, Manager (AD)(501)

Office 533
Environmental Affairs Program
Chuck Buril, Manager

OSMS Directorate



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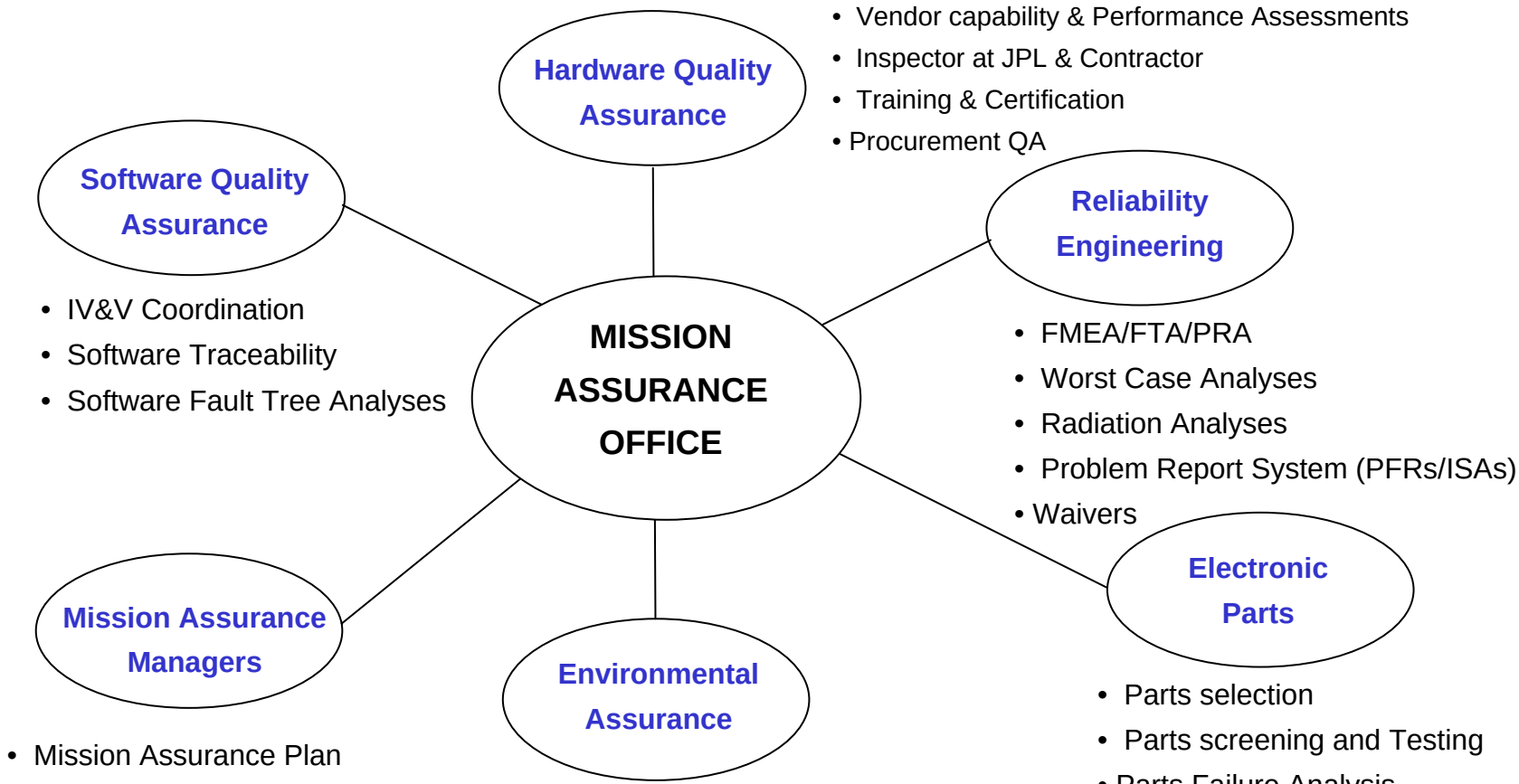
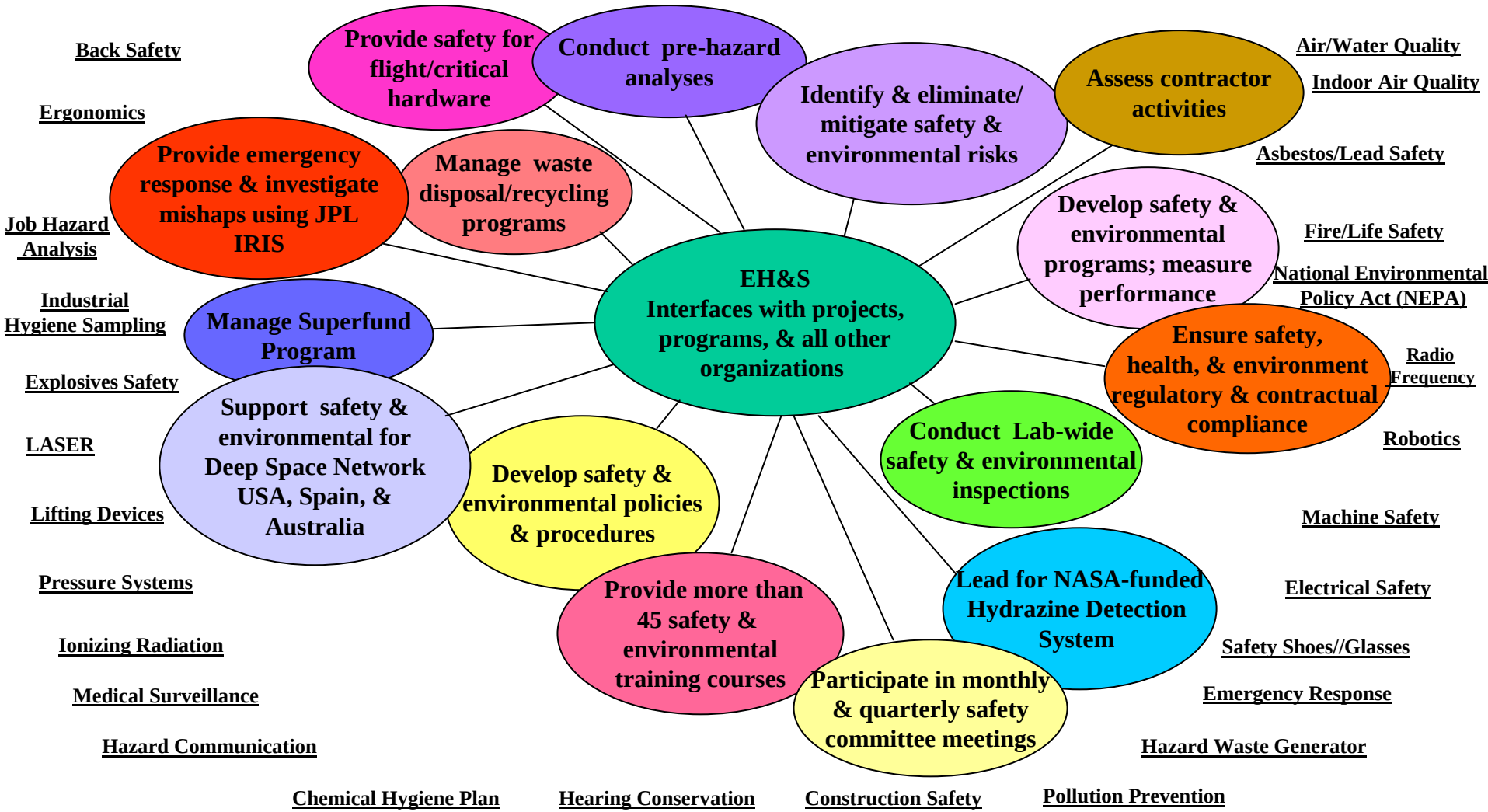
Mission Assurance Disciplines

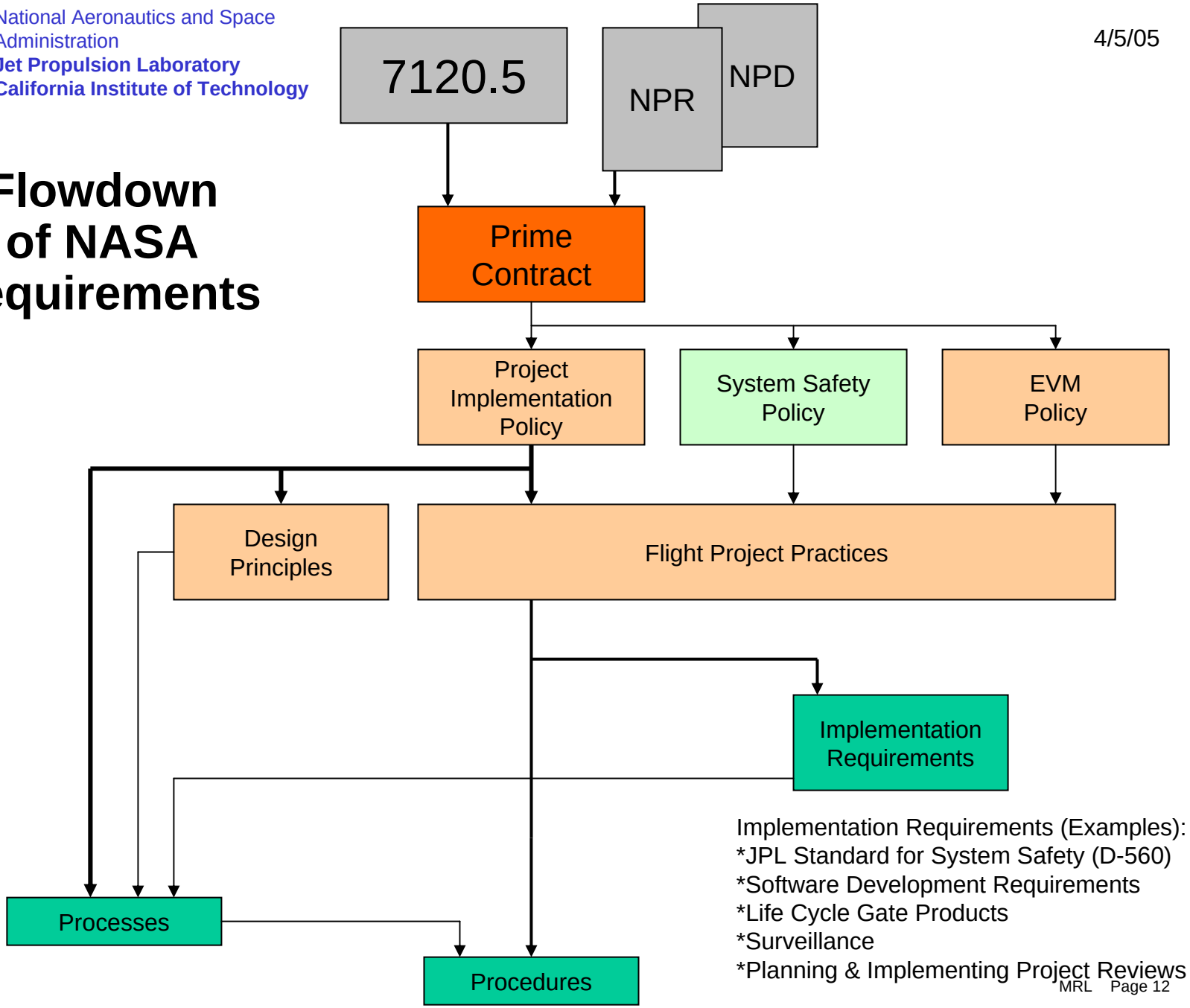



EH&S
Interfaces with projects, programs, & all other organizations
Provide safety for flight/critical hardware
Conduct pre-hazard analyses
Identify & eliminate/ mitigate safety & environmental risks
Assess contractor activities
Develop safety & environmental programs; measure performance
Ensure safety, health, & environment regulatory & contractual compliance
Conduct Lab-wide safety & environmental inspections
Lead for NASA-funded Hydrazine Detection System
Participate in monthly & quarterly safety committee meetings
Provide more than 45 safety & environmental training courses
Develop safety & environmental policies & procedures
Support safety & environmental for Deep Space Network USA, Spain, & Australia
Manage Superfund Program
Provide emergency response & investigate mishaps using JPL IRIS
Manage waste disposal/recycling programs
Back Safety
Ergonomics
Job Hazard Analysis
Industrial Hygiene Sampling
Explosives Safety
LASER
Lifting Devices
Pressure Systems
Ionizing Radiation
Medical Surveillance
Hazard Communication
Chemical Hygiene Plan
Hearing Conservation
Construction Safety
Pollution Prevention
Hazard Waste Generator
Emergency Response
Safety Shoes//Glasses
Electrical Safety
Machine Safety
Robotics
Radio Frequency
National Environmental Policy Act (NEPA)
Fire/Life Safety
Asbestos/Lead Safety
Indoor Air Quality
Air/Water Quality

SMA Requirements

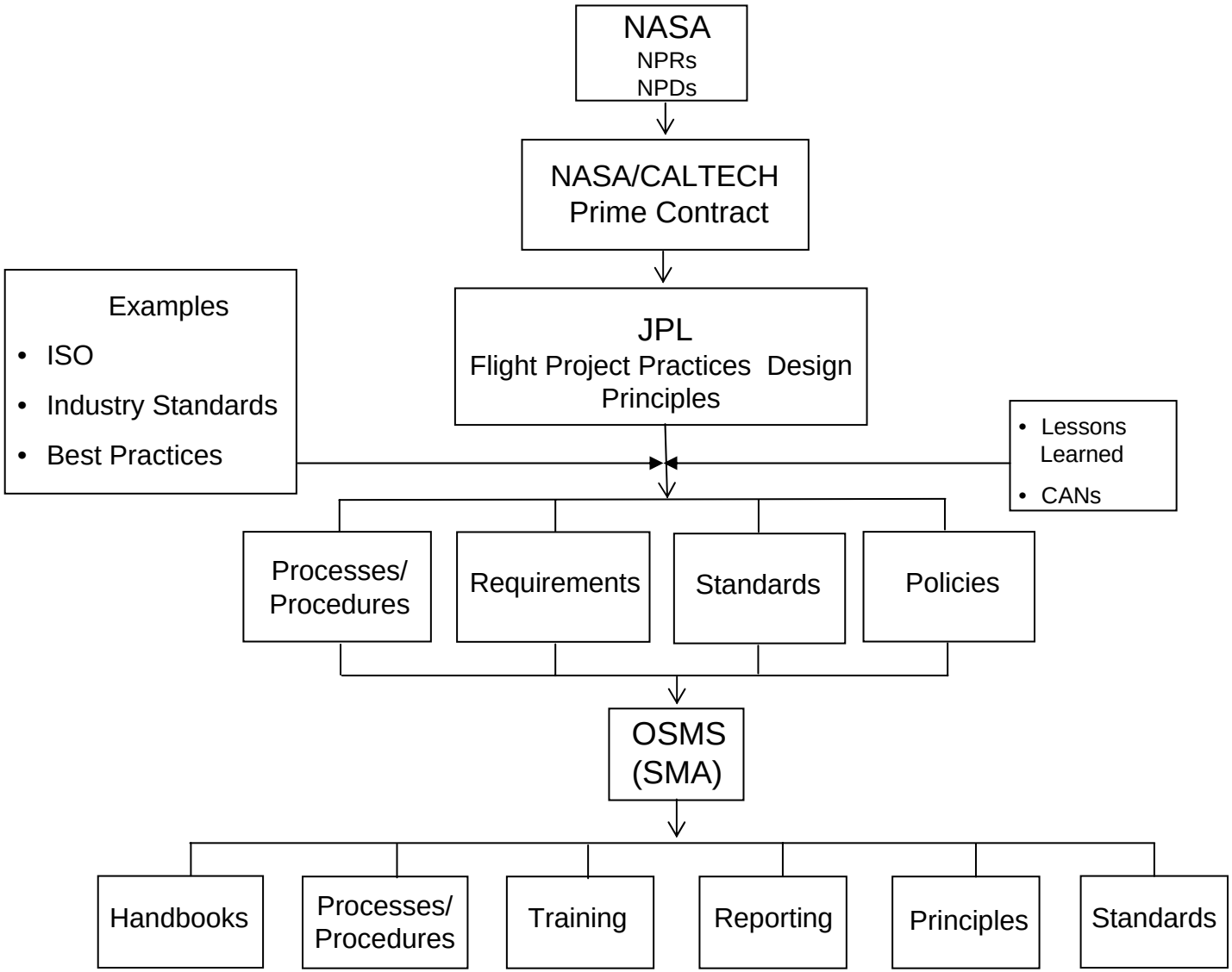
- **Sources**
- **Flowdown**
- **Compliance Verification Examples**

Flowdown of NASA Requirements

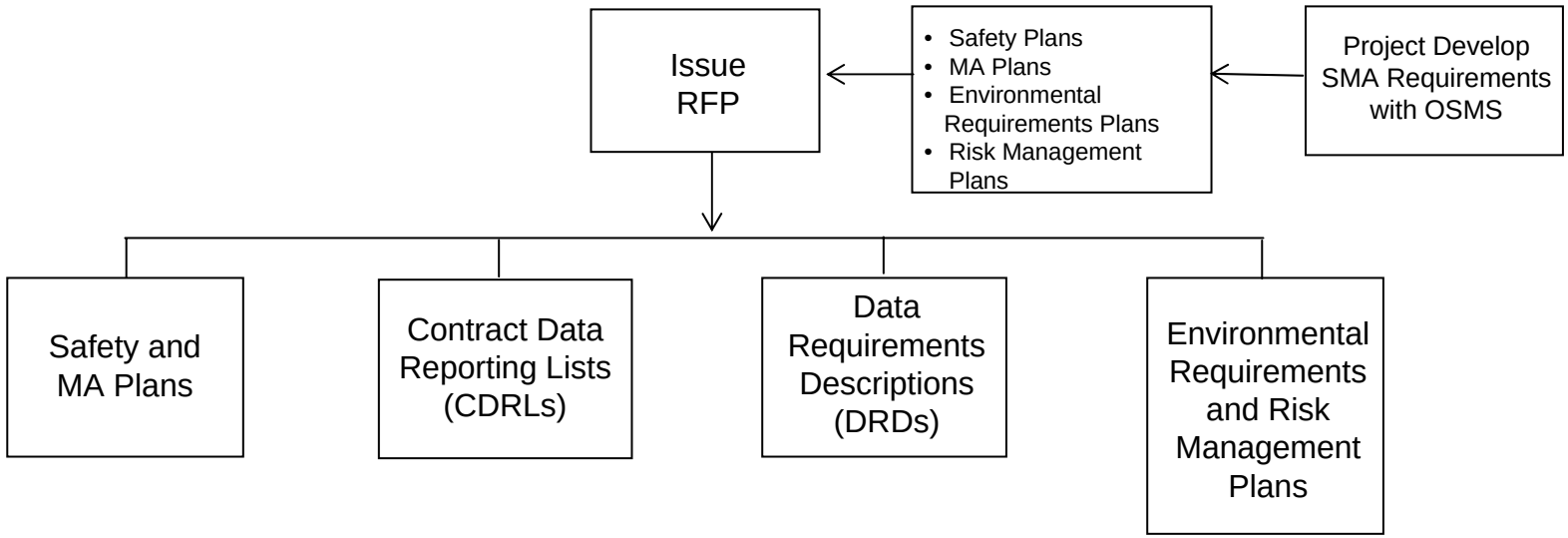


Implementation Requirements (Examples):
*JPL Standard for System Safety (D-560)
*Software Development Requirements
*Life Cycle Gate Products
*Surveillance
*Planning & Implementing Project Reviews

Requirements Flow Down Process to OSMS



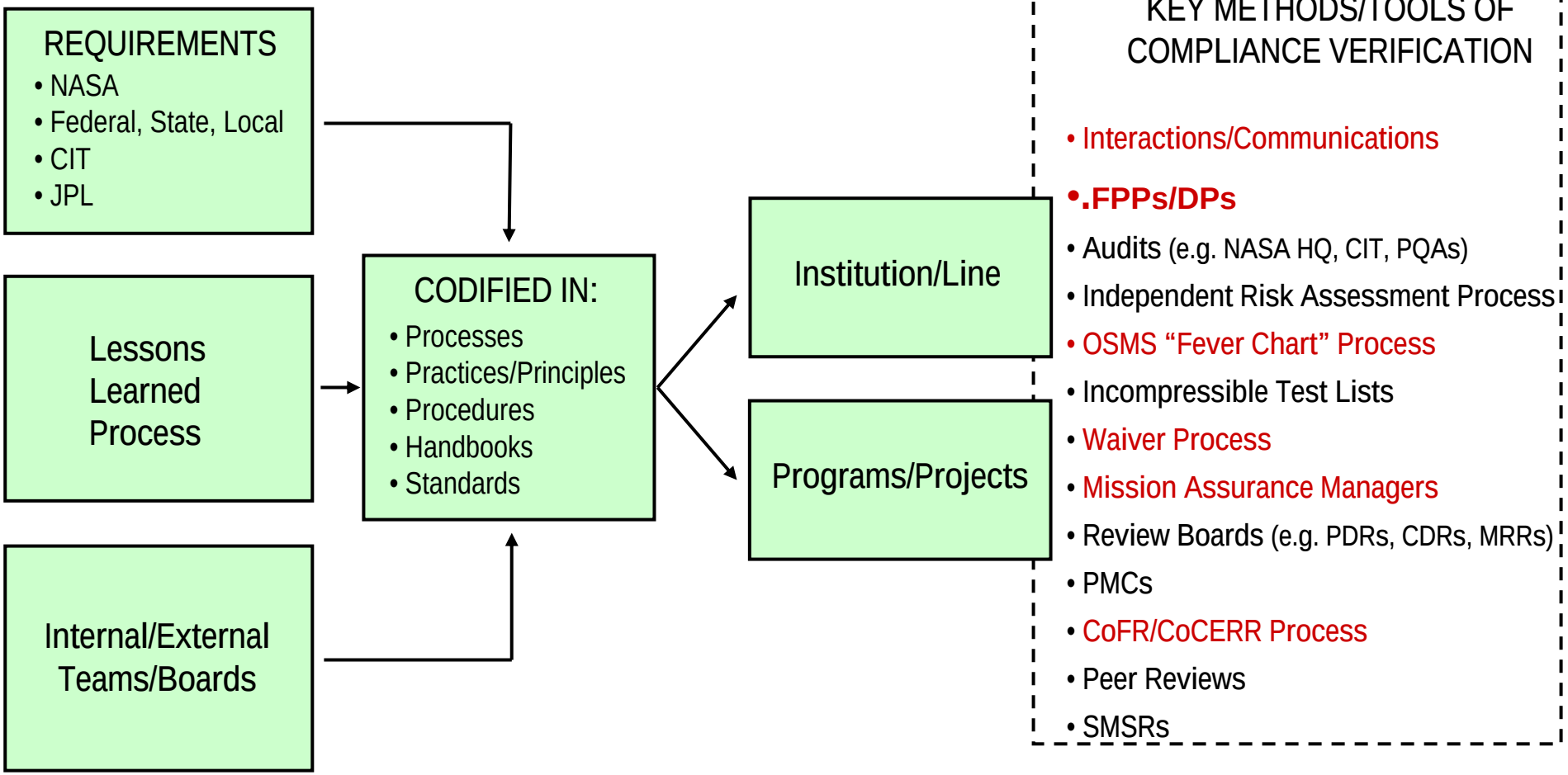
SMA Requirements Flow Down to Prime Contractors



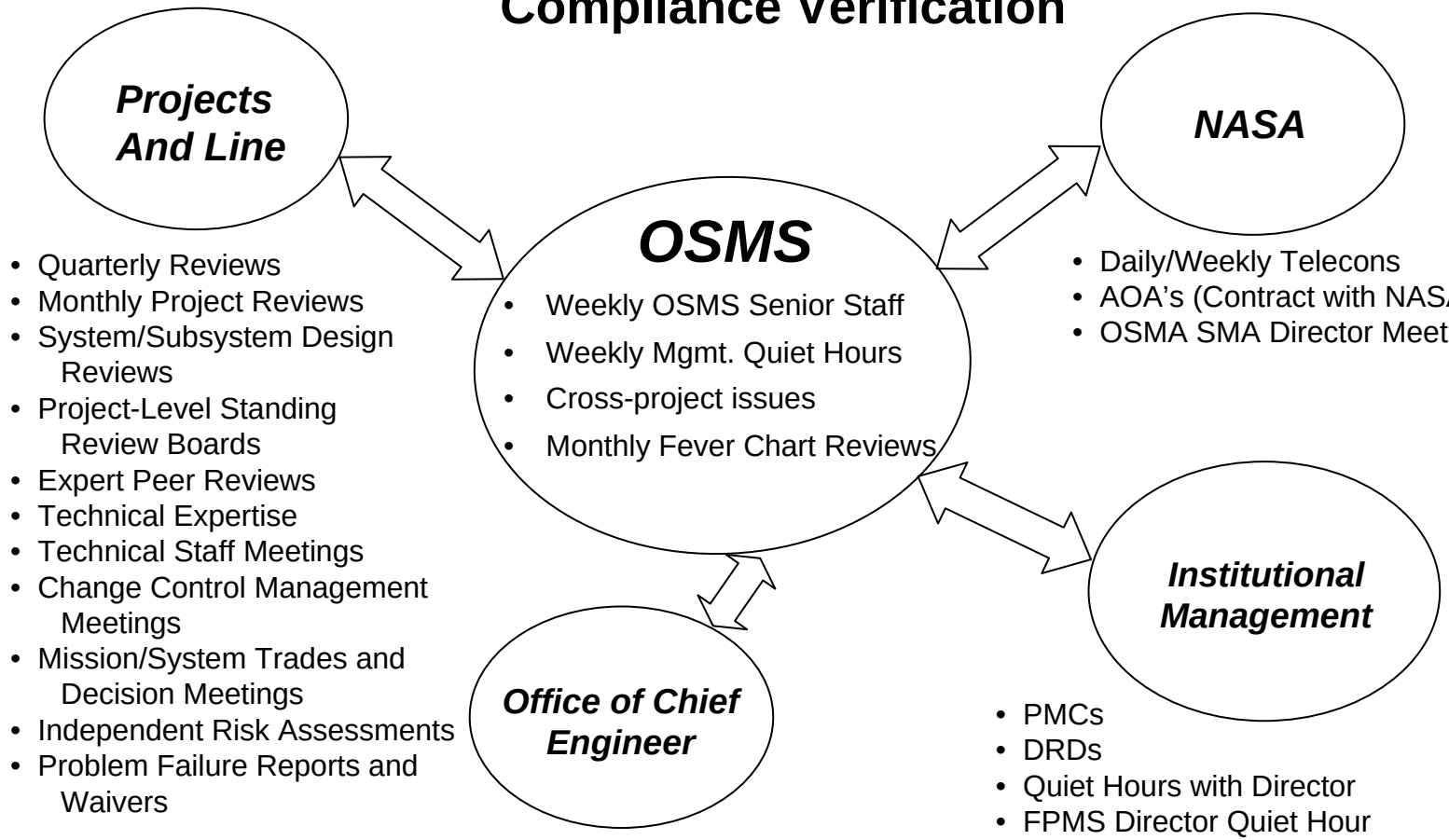
- System Contractor can use JPL Processes/Documents or demonstrate their processes/document meet the JPL requirements.

- JPL assesses contractor processes/documents.

JPL SMA Compliance Verification Process Overview



Interactions/Communications Supporting Compliance Verification



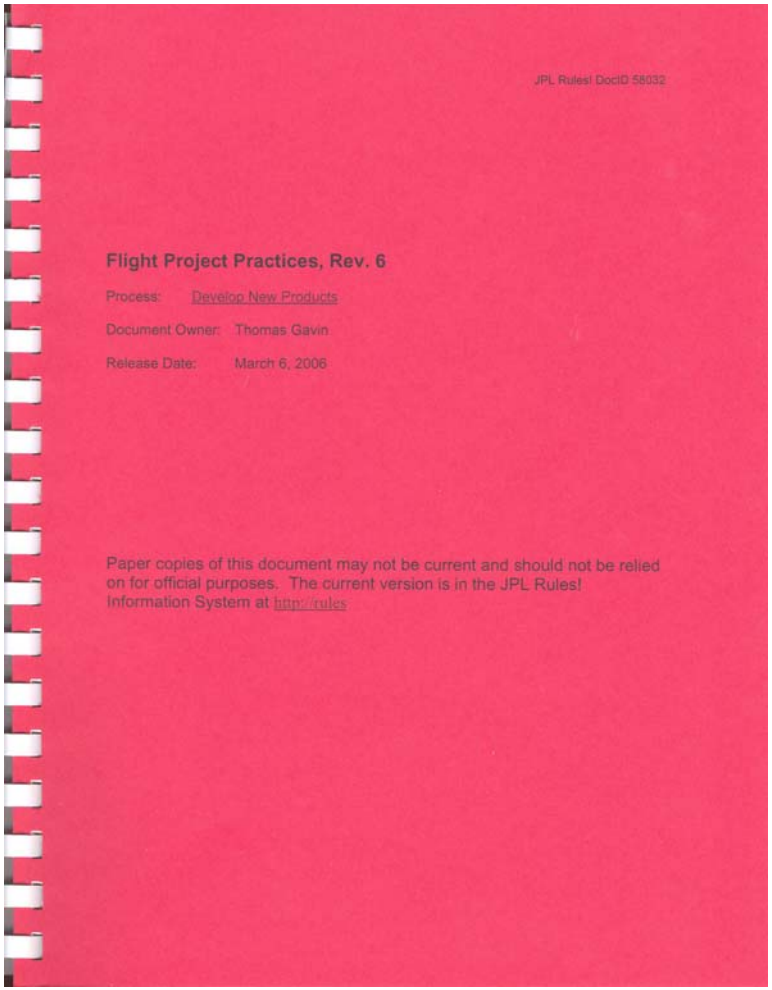
- Quarterly Reviews
- Monthly Project Reviews
- System/Subsystem Design Reviews
- Project-Level Standing Review Boards
- Expert Peer Reviews
- Technical Expertise
- Technical Staff Meetings
- Change Control Management Meetings
- Mission/System Trades and Decision Meetings
- Independent Risk Assessments
- Problem Failure Reports and Waivers

- Daily/Weekly Telecons
- AOA's (Contract with NASA Hq)
- OSMA SMA Director Meetings

- PMCs
- DRDs
- Quiet Hours with Director
- FPMS Director Quiet Hour
- Business Director Quiet Hour
- Weekly Staff Meetings with FPMS Director
- Weekly PEMC Meetings with Projects and Directors

- High Visibility/Risk Issues
- Cross-project Issues
- Weekly JEB Meetings
- CoFR and CoCERR
- Incompressible Test List (ITL)
- "Test Like You Fly" Exceptions

Flight Project Practices



(Rules! DocID 58032)

- **Applies to all projects regardless of implementation mode**
- **Specifies what projects are required to do**
- **Projects meet requirements, or get approval for deviation/exception**
- **Communicates the JPL way of doing business, both internally and to sponsors**
- **Provides for projects the JPL implementation of 7120.5**
- **Establishes standards of uniformity**
- **Initial compliance assessment is via the FPP Compliance Matrix**
- **Compliance verification process**
- **Deviations/Exceptions process**
- **Flight practices**

Flight Project Practices Rev 6 Content

Note: Sections 1-4 are Applicability, Purpose, Implementation, and Approval/Change Authority

Section 5 Management Practices

5.1 Life Cycle
5.2 Planning
5.3 Science
5.4 Project Organization
5.5 Work Breakdown Structure
5.6 NEPA Compliance & Launch Appl
5.7 Spares, Testbeds, and Models
5.8 Make-or-Buy Decisions
5.9 Scheduling, Cost Estimating, Etc
5.10 Information, Data Mgt & Archiving
5.11 Level 1 Descope Planning
5.12 Project Staffing & Destaffing
5.13 Priorities/Competing Characteristics
5.14 Acquisition
5.15 Project & Institutional Reporting
5.16 Reviews
5.17 Risk Management
5.18 Waivers
5.19 Crisis Response
5.20 Science Data Management
5.21 Ext Comm & Public Engagement
5.22 Lessons Learned
5.23 Margins & Margin Mgt
5.24 ITAR

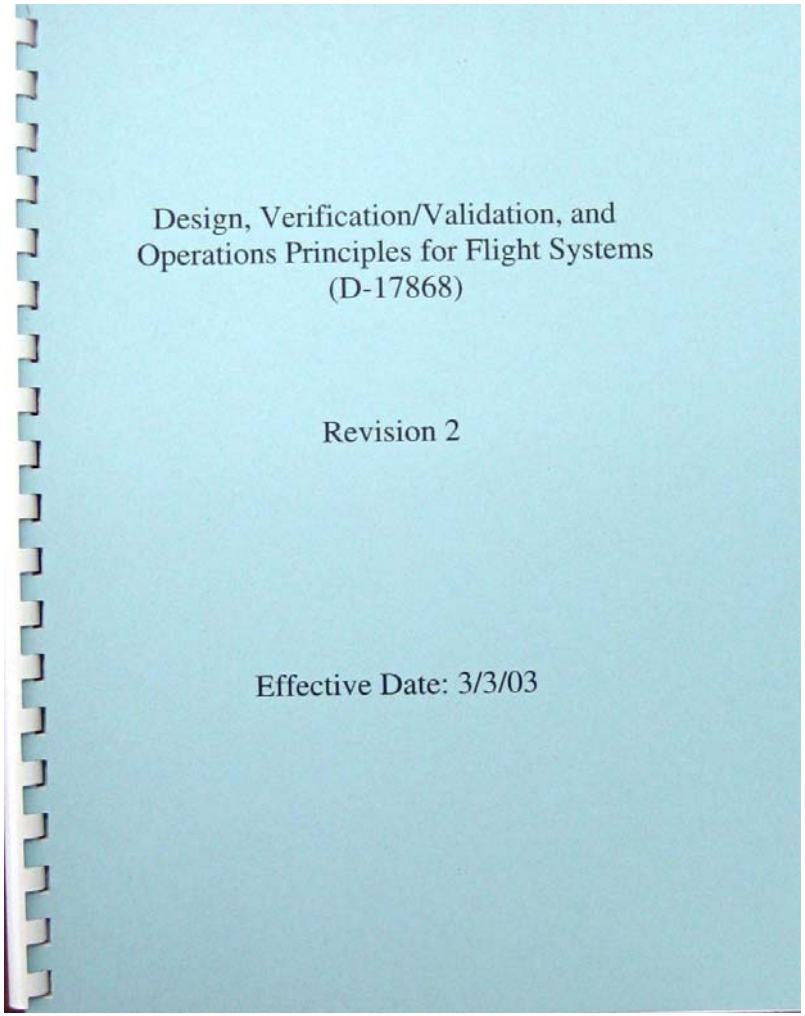
Section 6 Engineering Practices

6.1 Mission Design
6.2 Telecommunications Design
6.3 Mission Operations
6.4 System Engineering
6.5 L/V and Launch Operations
6.6 Inheritance
6.7 Planetary Protection
6.8 Flt Sys Fault Tolerance/Redundancy
6.9 Flight Hardware Logistics
6.10 Materials, Processes, and Contamination Control
6.11 Software Development
6.12 Protection and Security of Flt H/W
6.13 Design & Verification for Environmental Compatibility
6.14 System Level Functional V&V
6.15 Configuration Management
6.16 Orbital Debris
6.17 Hardware Development
6.18 Mission Ops System Development

Section 7 Safety & Mission Assurance Practices

7.1 Mission Assurance Management
7.2 Reliability Engineering
7.3 Quality Assurance
7.4 Software IV&V
7.5 Electronic Parts Reliability, Application and Acquisition
7.6 Problem Reporting
7.7 Mission Operations Assurance
7.8 Systems Safety

Design Principles

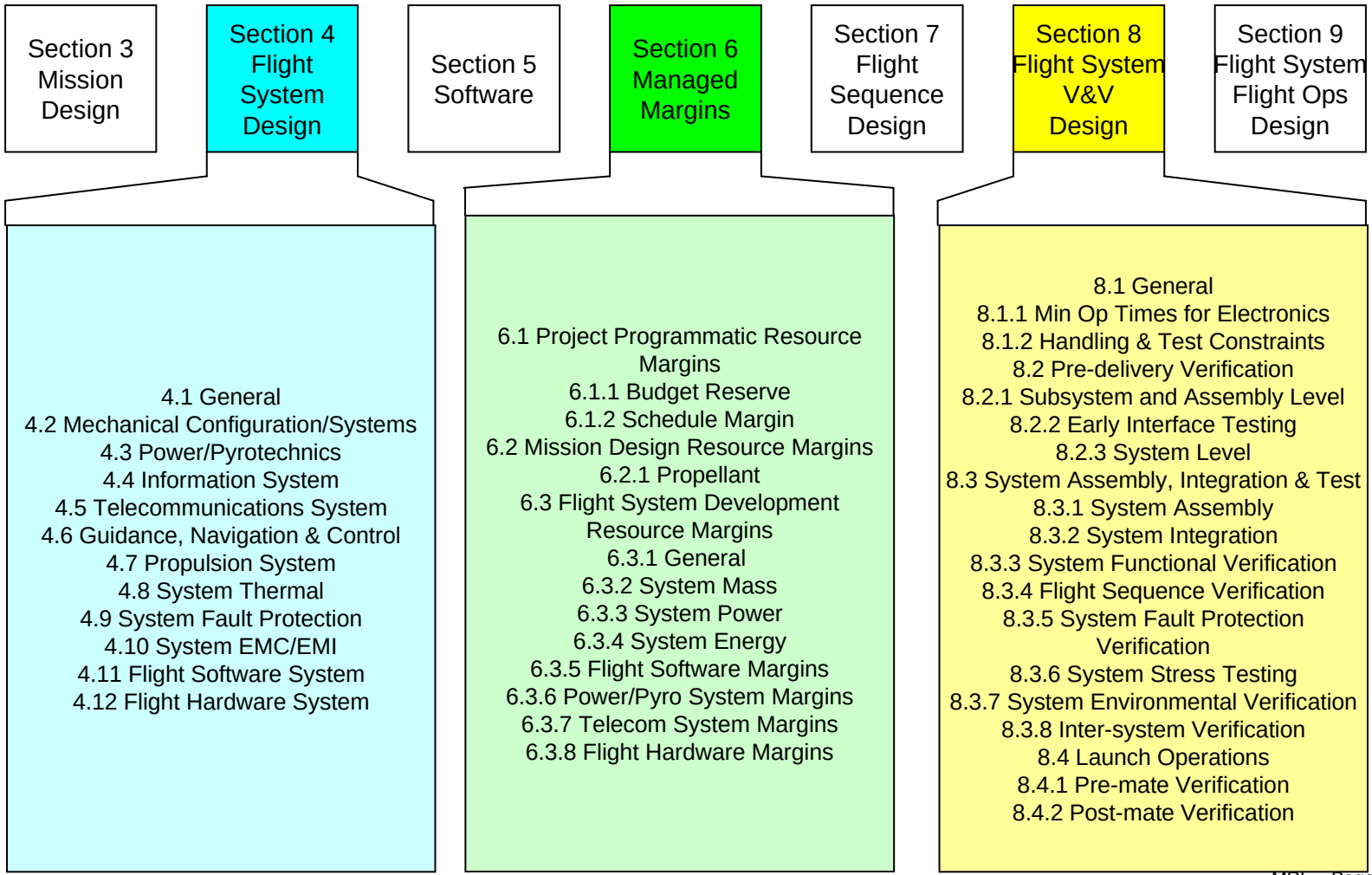


(Rules! DocID 43913)

- Applies to all flight designs, whether implemented in-house or at a contractor
- Specifies essential attributes of JPL flight designs
- Projects meet requirements, or get approval for deviation/exception
- Captures 40+ years of lessons learned
- Establishes robust design margins for high reliability
- Defines ample margins for management of development risk
- Defines a level of risk acceptable to management
- Engages management in dialog, when deviations are taken, of the risks being accepted
- Prevents management from being surprised by unacceptable risk at a time when it is too late to change the outcome
- Initial compliance assessment is via the DP Compliance Matrix
- Compliance verification process
- Deviations/Exceptions process
- Design principles

Design Principles Rev 2 Content

Note: Sections 1 and 2 are Applicability and Introduction



Approvers of Waivers

#	Cat A Document		Approvers of Waivers								
	Cat A Document		Proj Mgr	Pgm Dir For	Proc Owner	JPL CE	TA	PSO Mgr	ESD Dir	OSMS Dir	Only if Dissent
1	FPP -58032	Mgt	X	X				X			AD FP&MS
		Eng	X	X		X	X		X (CE signs for Dir)		AD FP&MS
		SMA	X	X						X	AD FP&MS
2	DPs -43913		X	X		X	X			X	AD FP&MS
3	Gate Products 60052) (59532/	Mgt	X	X				X			AD FP&MS
		Eng	X	X		X			X (CE signs for Dir)		AD FP&MS
		SMA	X	X						X	AD FP&MS
4	SDRs -57653		X	X	X Nichols						JPL CE
5	Reviews -56973		X	X	X Rose			X			JPL CE
6	Reqs Flowdown -60173		X	X	X Kahn						JPL CE
7	D-560 -34880		X	X	X Mortelliti		X			X	AD FP&MS
8	Surveillance -57353		X	X	X Imai			X		X	AD FP&MS
9	Risk Comm. Plan -61272		X	X	X Wilcox		X			X	AD FP&MS
10	Institutional Parts -57732		X	X	X Evans					X	JPL CE

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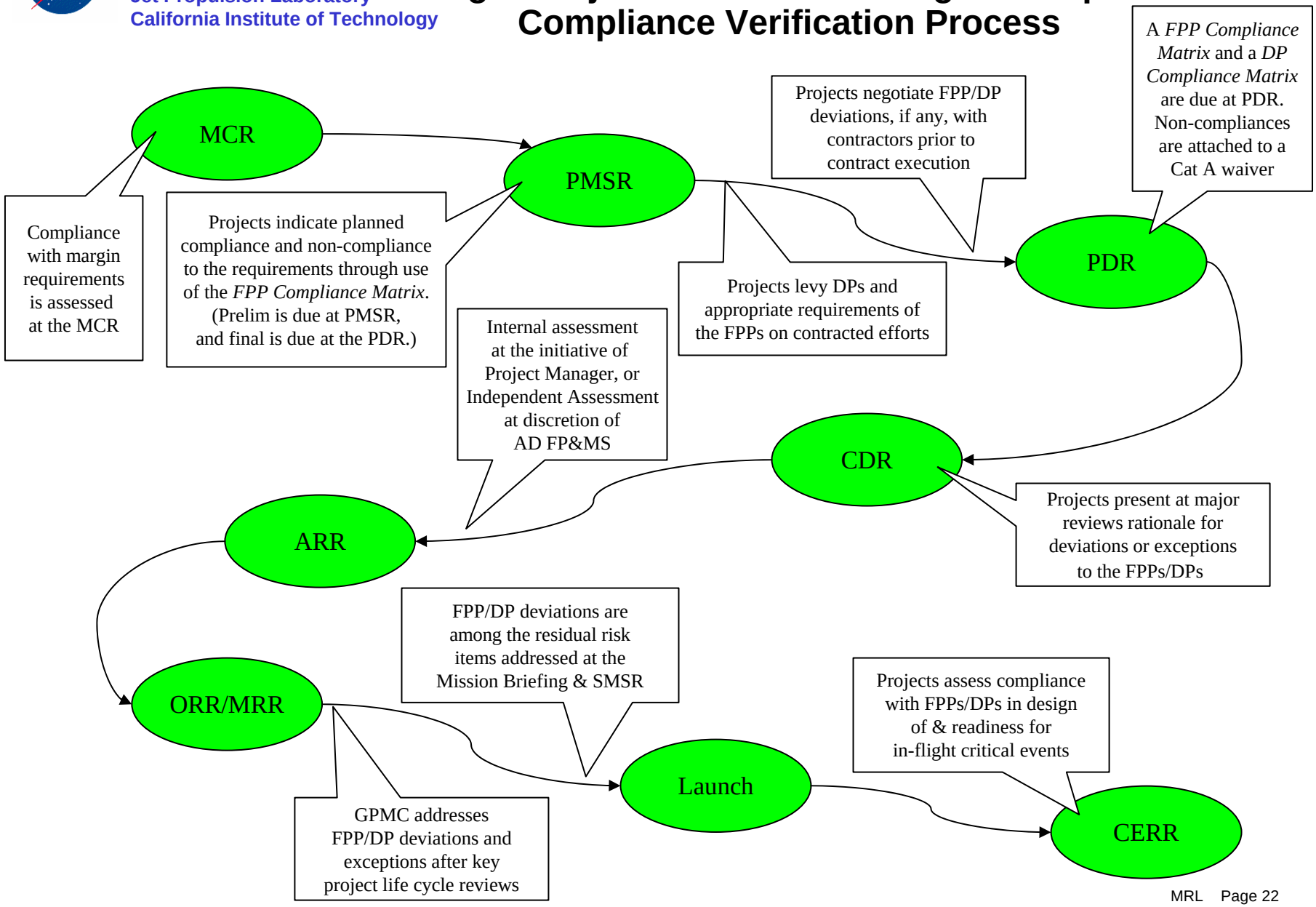
Flight Project Practices & Design Principles
Compliance Verification Process



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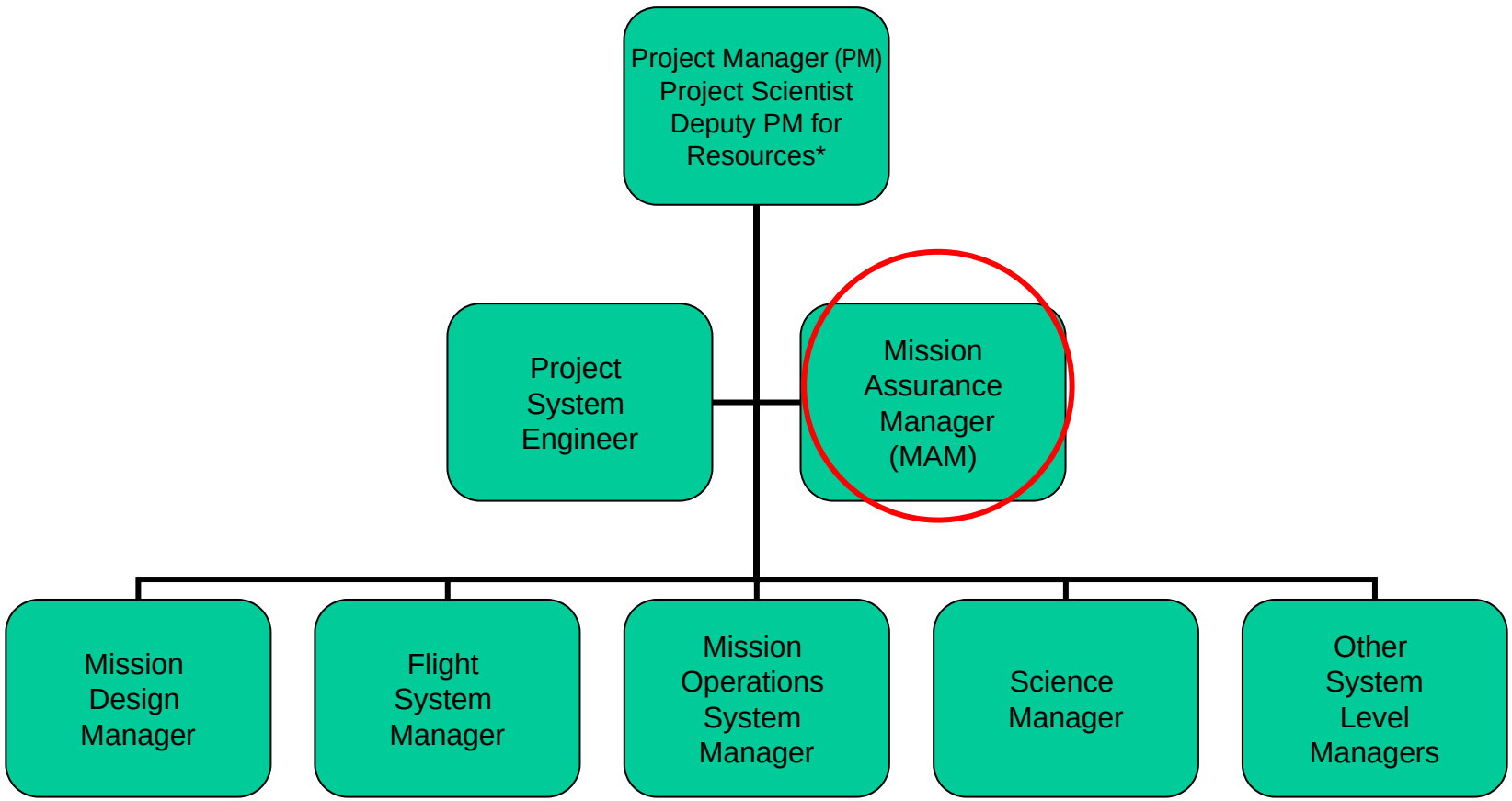
Fever Chart Example
Name of Project
Name of MAM

OSMS (51X)	MAM	SAFETY	QA	SQA	Config. Mgmt.	Reliability / Env.	Elect. Parts	Mat'ls/ Proc	Flight Ops	IV&V	Cont. Control
Y	Y	G	G	G	G	Y	R	G	G	G	G

- **Issue (For Yellow or Red Risk Rating):**
- **Open date:**
- **Resolution Plan:**
- **Status:**
- **Expected Closure:**

Typical Project Organization



* For designated projects

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OSMS Support to Projects

510/515
Manager: Tom Fraschetti
Deputy: Valerie Thomas
Assistant Manager: Cindi Kingery

Reviews/Risk Management – Rose
S/W Assurance/IV&V – Sigal
Chief Eng - Tien Nguyen

4X Chief MAM - Plourde	6X Chief MAM - none	7X Chief MAM - Mehta	8X Chief MAM - Guarino	DSMS PAM Witkowski
Dawn – Larson, Taylor	MSL - Kemski	H/P - Newell	Aquarius – Danesh	
Diviner – Plourde, Acting	Phoenix - Arakaki	Kepler - Facto	Cloudsat – Skinner	
ST-8 - Ellers	MSAP - Sigal	SIM - Doran	OCO – Skinner	
M3 – Hyman		ST-7 - Ramsey, Act	OSTM - Guarino	
EMOS – Plourde, Acting		WISE - Newell		
Juno - Kayali		AMT – Boyles, Romo		
		MIRI - Shaw		

Mission Ops. Assurance Chief MAM - Faris

Cassini - Woodall	MER - Faris	Galex – Faris	Acrimsat - Macias
Stardust - Faris	Odyssey - Macias	Spitzer – Kwong Fu	AIRS - Macias
US Rosetta - Macias	MGS - Faris		GRACE - Macias
	MRO - Tse		Jason - Hyman
			MLS - Macias
			TES - Macias
			MISR - Hyman
			Quikscat - Danesh

CoFR Signature Page

JPL Certification of Flight Readiness

Sign-off of this document certifies that a project has completed the products, tasks and reviews required for flight and that the residual risks to mission success are recognized, documented and deemed acceptable.

Project:	**Launch Date:**	
	Approval Signature	**Date**
Project System Engineer		
JPL Line Management Representative		
System Contractor Representative		
Mission Manager		
Flight System Manager		
Mission Assurance Manager		
Project Manager		
Director for		
Chief Engineer		
Director of OSMS		
Independent Technical Authority		
Associate Director for Flight Projects		

Adherence to JPL system development practices

	Project:									
	Completion of the following products document the project's adherence to JPL flight/mission system development practice. X's identify sign-off responsibility.	**SE**	**Sys Ctr**	**Lin Mgt**	**FSM/ MM**	**MAM**	**PM**	**OSMS**	**Remarks (attach additional documentation as needed)**	**Data Location (URL)**
1	System and subsystem design reviews, up to the MRR, including action item closures, are complete.	x	x	x	x	x	x			
2	System and subsystem environmental design and test requirements are documented, have been met and test reports released.	x	x	x	x	x	x	x		
3	System and subsystem design analyses (fault trees, FMECA, reliability, timing margin, functional models, mass properties, error budgets, etc.) are complete, been updated with test results, and reviewed.	x	x	x	x	x	x	x		
4	Hardware Drawings (ICD's, parts, assemblies, schematics, circuit data sheets, etc.) and design review documents, including action item closures, are complete.	x	x	x	x	x	x			
5	Software design description, source code, command and telemetry dictionary and design review documents, including action item closures, are complete.	x	x	x	x	x	x			
6	GDS, DSN and MOS design reviews (including mission design and navigation), through the ORR, including action item closures, are complete.	x	x	x	x	x	x			
7	HRCR, SRCR, inspection reports, log books, discrepancy reports, open analysis items, PFRs/ISAs (with audit by OSMS) are complete and all open items closed out (and/or contractor approved equivalent documents).	x	x	x	x	x	x	x		
8	Functional and performance requirements for complete and minimum mission success (including planetary protection) are documented and are being met.	x	x	x	x					
9	Institutional requirements compliance matrices, JPL Principles, Flight Project Practices have been audited and approved by OCE/OSMS.	x	x	x	x	x	x	x		

CoFR Risk Assessment

JPL Certification of Flight Readiness (page 3)

Project:

Completion of the following tasks and products document the project's residual risk to mission success. X's identify sign-off responsibility.	SE	FSM /MM	MAM	PM	OCE	TA	OSMS	SM	Remarks (attach additional documentation as needed)	Data Location (URL)
Functional and performance requirements for complete and minimum mission success (including planetary protection) are documented and are being met.	x	x	x	x						
Institutional requirements compliance matrices, JPL Principles, Flight Project Practices have been audited and approved by OCE/OSMS.	x	x	x	x	x	x	x			
V&V requirements compliance matrix, including calibration, alignment and phasing tests and as run procedures and test/analysis reports complete and reviewed by OCE/OSMS.	x	x	x	x	x		x			
Testbed certification of equivalence to flight system complete and all differences documented and accounted for.	x	x	x	x						
Incompressible Test List (ITL) tests (including operational readiness tests with flight software and sequences) complete, reviewed and any deviations approved by the JPL Director	x	x	x	x	x		x	x		
Test as you fly exception list complete, reviewed by OCE/OSMS and approved by senior management.	x	x	x	x	x		x	x		
All safety compliance documents (e.g. MSPSP) have been approved.	x	x	x	x		x	x			
Commissioning activities, flight rules, launch/hold critieria, idiosyncracies, and contingency plans are complete, reviewed and delivered to the flight team.	x	x	x	x						
Waivers (with audit of mod/high risk and dissent by OSMS) and red flag PFRs (with audit by OSMS/OCE) are complete and approved.	x	x	x	x	x	x	x	x		
All external interface (e.g. DSN, L/V, foreign partners) design and operational issues have been closed.	x	x	x	x						
Flight hardware certified and any shortfalls for critical events readiness, to allow post launch development, has been identified, reviewed and approved by senior management	x	x	x	x				x		
All post launch development work has been planned, reviewed and approved.	x	x	x	x				x		
All work-to-go to launch activities have been planned, reviewed and approved.	x	x	x	x			x	x		
Residual risk list complete, reviewed and approved by senior management.	x	x	x	x	x		x	x		

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CloudSat CoFR page 2

JPL Certification of Flight Readiness (page 2)

Project:

	Completion of the following products document the project's adherence to JPL flight/mission system development practice. X's identify sign-off responsibility.	SE	Sys Ctr	Lin Mgt	FSM/ MM	MAM	PM	OSMS	Remarks (attach additional documentation as needed)	Data Location (URL)
1	System and subsystem design reviews, up to the MRR, including action item closures, are complete.	x	x	x	x	x	x			https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-243
2	System and subsystem environmental design and test requirements are documented, have been met and test reports released.	x	x	x	x	x	x	x	OSMS review is through standard review process and thru MAM oversight	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1820 https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1703 https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1654 https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1729
3	System and subsystem design analyses (fault trees, FMECA, reliability, timing margin, functional models, mass properties, error budgets, etc.) are complete, been updated with test results, and reviewed.	x	x	x	x	x	x	x	OSMS review is through standard review process and thru MAM oversight	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-682 https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-453 https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1762 https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-472 https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-386 https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-205
4	Hardware Drawings (ICD's, parts, assemblies, schematics, circuit data sheets, etc.) and design review documents, including action item closures, are complete.	x	x	x	x	x	x		Drawing on BATC server	https://pdms.jpl.nasa.gov/_layouts/tcclogin/login.aspx?ReturnURL=%2f https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-834 https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1565
5	Software design description, source code, command and telemetry dictionary and design review documents, including action item closures, are complete.	x	x	n/a	x	x	x		No open SCRs: Participated in flight software heritage build peer code review in 3/02, FQt readiness reviews (3/03); Reviewed FQT results (4/03; SCRs and SQERs to verify that Ball was documenting presses	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/Get/File-8173/10_Flight_Software.ppt http://aerokm/livelink/llisapi.dll?func=ll&objId=212068&objAction=browse
6	GDS, DSN and MOS design reviews (including mission design and navigation), through the ORR, including action item closures, are complete.	x	n/a	n/a	x	x	x		DSN (Deep Space Network) is "AFSCN (Air Force Satellite Control Network)" for CloudSat	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-370 https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-243
7	HRCR, SRCR, inspection reports, log books, discrepancy reports, open analysis items, PFRs/ISAs (with audit by OSMS) are complete and all open items closed out (and/or contractor approved equivalent documents).	x	x	x	x	x	x	x	OSMS review is through standard review process and thru MAM oversight; Some items (eg. Cert logs) in the BATC end-item-data-pkg delivered in place, archaived and available for review	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1580 http://aerokm/livelink/llisapi.dll?func=ll&objId=212068&objAction=browse https//problemreporting.jpl.nasa.gov

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CloudSat CoFR page 3

JPL Certification of Flight Readiness (page 3)

Project:

	Completion of the following tasks and products document the project's residual risk to mission success. X's identify sign-off responsibility.	SE	FSM /MM	MAM	PM	OCE	ITA	OSMS	SM	Remarks (attach additional documentation as needed)	Data Location (URL)
8	Functional and performance requirements for complete and minimum mission success (including planetary protection) are documented and are met.	x	x	x	x					Planetary protection does not apply	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1064
9	Institutional requirements compliance matrices, JPL Principles, Flight Project Practices have been audited and approved by OCE/OSMS.	x	x	x	x	x	x	x		Note: Audit of compliance performed by OCE, audit of waivers performed by OSMS	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1819
10	V&V requirements compliance matrix, including calibration, alignment and phasing tests and as run procedures and test/analysis reports complete and reviewed by OCE/OSMS.	x	x	x	x	x		x		Items reviewed by Ray Welch, Gary Lau and Tooraj Kia per ESTD direction. OSMS review is through standard review process and thru MAM oversight	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1781 https://cloudsat-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/Get/File-8212/CPR_FM_test-calib_rept_2.1.doc
11	Testbed certification of equivalence to flight system complete and all differences documented and accounted for.	x	x	x	x					Note: OCE reviewed this as part of Flight Project Practices and Design Principles audit (no, 9 above)	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1819 https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/Get/File-9160/TB_HW_Certification_Memo.doc https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/Get/File-9356/CPR_Certification_Memo.doc
12	Incompressible Test List (ITL) tests (including operational readiness tests with flight software and sequences) complete, reviewed and any deviations approved by the JPL Director	x	x	x	x	x		x	x	No deviations from ITL. SM/OCE/OSMS approval process is through standard review process	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/Get/File-7179/Incompressible_Test_List.pdf
13	Test as you fly exception list complete, reviewed by OCE/OSMS and approved by senior management.	x	x	x	x	x		x	x	SM/OCE/OSMS approval process is through standard review process	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1762 https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1761
14	All safety compliance documents (e.g. MSPSP) have been approved.	x	x	x	x		x	x		The safety compliance documentation status was reviewed at the PSR and GOR	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-252
15	Commissioning activities, flight rules, launch/hold critieria, idiosyncracies, and contingency plans are complete, reviewed and delivered to the flight team.	x	x	x	x					https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-252	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1883 https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-871
16	Waivers (with audit of mod/high risk and dissent by OSMS) and red flag PFRs (with audit by OSMS/OCE) are complete and approved.	x	x	x	x	x	x	x	x	OCE audite completd on 3/25/05	https://pdms.jpl.nasa.gov/_layouts/tcclogin/login.aspx?ReturnURL=%2f https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1879
17	All external interface (e.g. DSN, L/V, foreign partners) design and operational issues have been closed.	x	x	x	x					DSN is AFSCN for CloudSat; as presented at the MRR by Mike Davis; ORR issues closed	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-23
18	Flight hardware certified and any shortfalls for critical events readiness, to allow post launch development, has been identified, reviewed and approved by senior management.	x	x	x	x				x	Note: No Post-launch development planned	None
19	All post launch development work has been planned, reviewed and approved.	x	x	x	x				x	Note: No Post-launch development planned	None
20	All work-to-go to launch activities have been planned, reviewed and approved.	x	x	x	x			x	x	Reviewed at the Mission Readiness Review	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1813
21	Residual risk list complete, reviewed and approved by senior management.	x	x	x	x	x		x	x	Risk list approved at Risk Assessment Review	https://partners-lib.jpl.nasa.gov/cloudsat-lib/dscgi/ds.py/View/Collection-1762

CloudSat CoFR Signatures

JPL Certification of Flight Readiness

Sign-off of this document certifies that a project has completed the products, tasks and reviews required for flight and that the residual risks to mission success are recognized, documented and deemed acceptable.

Project:	**Launch Date:**	
	Approval Signature	**Date**
Project System Engineer		26 July 2005
JPL Line Management Representative		8/5/05
System Contractor Representative		8/5/05
Mission Manager		9/7/05
Flight System Manager		7/27/2005
Mission Assurance Manager		7/27/05
Project Manager		9/7/05
Chief Engineer		9/8/05
Director for		9/7/05
Independent Technical Authority		9/8/05
Director of OSMS		9/9/05
Associate Director for Flight Projects		9/9/05

SUMMARY

- Compliance Verification is embedded in how JPL does business
- Must have good processes/procedures which are updated
- SMA organization must be engaged
- When all is said and done- it is about risk!